



NPOESS EMD/PRODUCTION STATEMENT OF OBJECTIVES

24 JAN 2002

1.0 Introduction

1.1 **Program Background.** The National Polar-orbiting Operational Environmental Satellite System (NPOESS) program was designated by Presidential Decision Directive as the single satellite system replacing the Department of Commerce (DOC) Polar-orbiting Operational Environmental Satellite (POES) and the Department of Defense (DoD) Defense Meteorological Satellite Program (DMSP) satellites. To accomplish this mission, the two-satellite DMSP and the two-satellite POES constellations will be replaced by NPOESS satellites in three orbital planes.

1.2 **NPOESS Mission Description.** The NPOESS will remotely sense global and regional environmental data from space, transmit raw data to ground terminals, process it into Environmental Data Records (EDRs), and disseminate it to civil and military users. Environmental data will include radiometric observations of the atmosphere and cloud cover imagery, as well as other specialized environmental, climatic, terrestrial, oceanographic, and solar-geophysical data. An Initial Operational Capability (IOC) will be declared when: (a) NPOESS satellites are operational in two different orbital planes, (b) the EDR attributes associated with those two orbits are satisfied, (c) all weather Centrals are receiving processed data, (d) field terminal software is available; and (e) all Ground Segment elements required to operate all future production satellites have been delivered, tested, and certified ready for operations by the Government.

2.0 Program Objectives

2.1 To provide a single, national, polar remote-sensing capability to acquire, receive and disseminate global and regional environmental data.

2.2 To achieve National Performance Review (NPR) cost savings through the convergence of DoD and DOC environmental satellite programs.

2.3 To incorporate, where appropriate, technology transitioned from the National Aeronautics and Space Administration, Office of Earth Science Enterprise programs.

2.4 To encourage international cooperation.

3.0 Engineering & Manufacturing Development (EMD)

3.1 **Phase Objective.** The overall objectives of the NPOESS EMD effort are the completion of the final system design and the fabrication, test, deployment and support necessary to provide a capability for satellite environmental remote sensing sustainable for the program life-cycle.

3.2 **System Development, Integration, System Engineering and Ground System Deployment Objectives.**

3.2.1 Complete NPOESS development to the Critical Design Review (CDR) level and obtain Government approval of all final external interface requirements.

3.2.2 Track the progress of the Government's Windsat, NAST and other research programs and infuse technology lessons learned from these experiments to improve NPOESS performance and reduce risk.

3.2.3 Incorporate the current Government initiated sensor developments into the EMD design. Procure (or develop), integrate, and test sufficient instruments to achieve system requirements.

3.2.4 Deliver to the NPP satellite contractor VIIRS and CrIS templates, models, flight-qualified instruments and associated ground support equipment; provide engineering support for development of ICDs, integration & test plans and on-orbit activation plans and procedures; support instrument and satellite integration and test activities as required to support the NPP launch schedule.

3.2.5 Deliver and support C3 and IDP segments in time to support the projected NPP launch schedule. Provide for a seamless installation and integration of the IDP and C3 Segments into their host facilities.

3.2.6 Apply lessons learned from NPP to the development of NPOESS to efficiently and effectively transition appropriate NPP systems, subsystems, algorithms, and test facilities to NPOESS.

3.2.7 Complete delivery of C3 and IDP and Field Terminal segments to support the projected NPOESS launch schedule. Provide for a seamless installation and integration of the IDP and C3 Segments into their host facilities. Provide support to integration of the Field Terminal segment to agency field terminal program offices. Complete delivery of C3, IDP, and Field Terminal segments to support all projected production satellites.

3.2.8 Deliver the OMPS instrument for a flight of opportunity. Support integration and test of the instrument on the spacecraft and launch/post launch activity.

3.2.9 Develop instrument and system calibration plans and participate in the on-going calibration/validation efforts.

3.3 C1 & C2 Manufacturing and Planning for Production. Complete final sensor and satellite manufacturing, and planning for on-orbit checkout and calibration and validation activities required to achieve a launch call-up capability for NPOESS satellite(s) to support the launch schedule. The production strategy must accommodate the interchangeable configuration and launch of any satellite into any orbit to support backup and replacement requirements.

3.4 System Performance Verification. Implement and support a contractor and Government combined test and evaluation program (i.e. Combined Test Force (CTF)) encompassing both developmental and operational tests following the outlines in the Test and Evaluation Master Plan (TEMP). Minimize the cost and time for testing while assuring an acceptable level of performance risk. Wherever practical, integrated system tests of ground equipment and computer software installed in an operational system are preferred. Ideally, these tests will be conducted at target sites with operational personnel, enabling early combined Operational Test & Evaluation opportunities.

3.4.1 Validation and Verification

3.4.1.1 Demonstrate that all systems are properly integrated and functional (including satellite commanding and MMC functions). Demonstrate that mission data can be received, processed to specification, and distributed to NPOESS users. Demonstrate that error handling software is sufficiently robust to maintain performance of MMC and mission data processing functions through off-nominal and degraded conditions.

3.4.1.2 Validate by analysis, modeling, and/or simulation that EDR requirements are met under a broad range of conditions that are representative of those occurring in nature. All relevant sources of error, including those associated with the scene radiance, instrument, spacecraft, data transmission, and algorithms, shall be taken into account.

3.5 Initial Deployment. Support NPP mission system operational tests in preparation for mission readiness reviews and NPP Launch. Launch, checkout, calibrate, validate sufficient NPOESS satellites to achieve IOC. Launch services will be provided by the Government, using contractor support for both NPP and NPOESS satellites.

3.6 Pre-IOC Contractor Operations and Support. Establish an integrated system life-cycle supportability concept/design, consistent with system readiness/availability/dependability and LCC goals. Develop and define an optimized support infrastructure for Test & Evaluation (T&E) activities, production and deployment. Define Integrated Logistics Support (ILS) T&E requirements, including pre-operational support requirements. Deliver, install, activate, and deploy the total system support infrastructure, including site activation necessary to sustain initial operations – i.e., Interim Contractor Support (ICS) through IOC. The ICS architecture shall be flexible and support a transition of ILS to a Government agency or another contractor after IOC. Provide technical and program support needed to sustain the operational system at the required performance and cost objectives.

3.6.1 Provide documentation, training, and personnel for the operation, maintenance, and upgrading of the NPP C3 and IDP Segments through IOC.

3.6.2 Operate and support the NPP satellite, C3 and IDP segments. Deliver required RDR, SDR, TDR, and EDR performance.

3.6.3 Provide documentation, training, and personnel for the operation, maintenance, and upgrading of the NPOESS IDP and C3 segments through IOC. Provide documentation, training, and personnel for the maintenance and upgrading of the Field Terminal Segment software through IOC.

3.6.4 Operate and support sufficient NPOESS satellites to achieve IOC

4.0 Production

4.1 Phase Objective. The overall objectives of the NPOESS Production effort are the completion of the fabrication, test, deployment, storage, and launch support necessary to provide a capability for satellite environmental remote sensing for 10 years past first capability to launch.

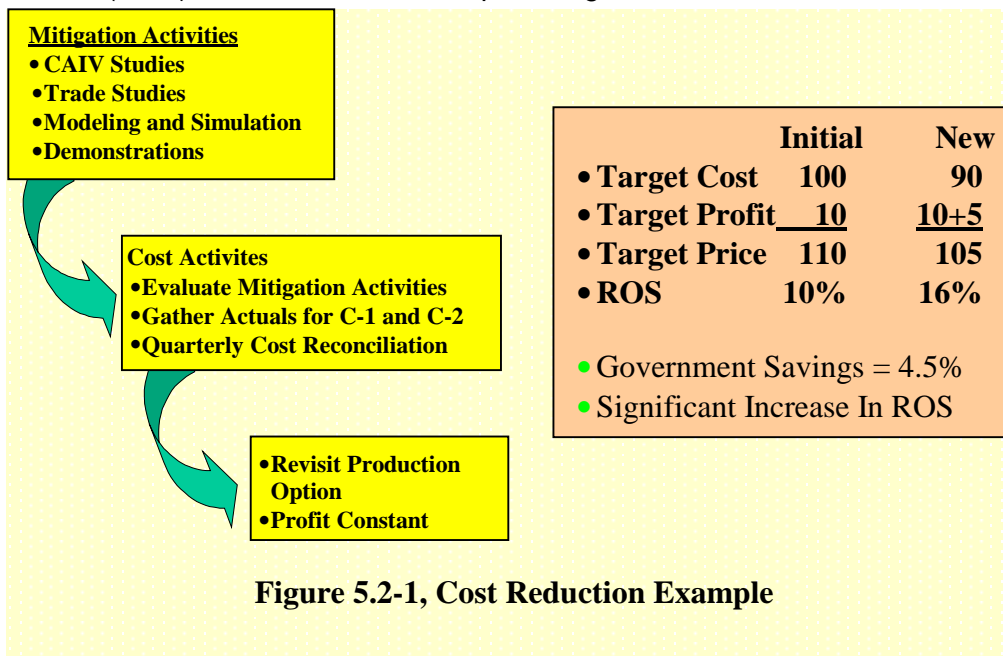
4.2 Satellite Production and Deployment. Complete all sensor, spacecraft bus, and satellite production, and the on-orbit checkout, calibration, and validation activities required to maintain the required operational availability throughout the NPOESS mission life. The production strategy must accommodate the interchangeable configuration and launch of any satellite into any orbit to support backup and replacement requirements.

4.3 Product Improvement. Infuse technology developments into the system design, throughout the NPOESS life cycle to expand system utility through instrument modifications and further exploitation of collected environmental data; e.g., continuous EDR performance improvement.

5.0 Cost Reduction Initiatives

5.1 Objective. Corporate commitment shall be made to achieve the objectives described above and provide a foundation for successful long-term partnership (i.e. life of program) based on tangible guarantees of performance (milestone accomplishment and mission integrity), commitment to resource staffing, and innovative corporate business initiatives targeted at accelerating future architecture migration and NPOESS objectives.

5.2 Life Cycle Cost Reduction Process. Conduct cost analyses and trades assuring a continuing cost effective implementation of NPOESS, use efficient long-lead procurement and sparing philosophies, maintain an efficient skill mix as the program matures, develop credible cost reduction estimates/recommendations based on cost-reduction opportunities identified during development and production, and provide information to support the development of government life cycle cost estimates. Share cost reductions to improve the contractor's Return on Sales (ROS) as shown in the example in Figure 5.2-1.



6.0 **Management and Control**

6.1 **Objective.** Provide flexible and innovative management of program cost, schedule, performance, risks, contracts and subcontracts, other agencies and data required to deliver and sustain an effective and affordable system.

6.2 **Management and Control Process.** Manage the EMD/Production program via the Integrated Management Framework as shown in Figure 6.2-2. The Government will conform to the contractor's desired organizational structure and fully expects a matrix management approach to personnel assignment.

